**356. Proposed by G. I. HOPKINS, Manchester, N. H.**

Required to construct a triangle having given, base, vertical angle, and difference of other two sides.

## CALCULUS.

**284. Proposed by L. H. McDONALD, M. A., Ph. D., Sometimes Tutor at Cambridge, Jersey City, N. J.**

Inscribe the triangle of maximum area in a given circle.

**285. Proposed by C. N. SCHMALL, 604 East 5th Street, New York City.**

If $R_1$ and $R_2$ are the radii of curvature of an ellipse at the extremities of a pair of conjugate diameters, show that $R_1^{2/3}+R_2^{2/3}=\dfrac{a^2+b^2}{(ab)^{2/3}}$, where $a$, $b$, are the semi-axes.

**286. Proposed by R. D. CARMICHAEL, Princeton University.**

Solve the differential equation

$$\begin{aligned}&[a_0x^3+a_1x^2y+a_2xy^2+(a_0-a_1+a_2)y^3\\ &\qquad +a_3x^2+a_4xy+a_5y^2+a_6x+a_7y+a_8]dx\\ &+[a_0y^3+a_1xy^2+a_2x^2y+(a_0-a_1+a_2)x^3\\ &\qquad +a_3y^2+a_4xy+a_5x^2+a_6y+a_7x+a_8]dy=0.\end{aligned}$$

## MECHANICS.

**238. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.**

Find the position of the center of pressure of a semi-elliptical area completely immersed in water, the bounding major-axis being inclined to the horizon at an angle $\beta$, and having one extremity in the surface of the water.

**239. Proposed by J. G. ROSE, B. A. (Oxion), Mt. Angel College, Oregon.**

A uniform bar of length $2a$ is placed in a sloping position, its lower end on the ground (coefficient of friction being $\mu$), its upper end in the air, the bar being supported by a rough fixed peg (coefficient of friction $\mu'$), against which it rests. If $h$ is the height of the peg from the ground, and if $\theta$ be the angle the bar makes with the horizon, when on the point of slipping, prove that $\theta$ is to be found from the equation

$$\sin\theta\cos\theta\,[(\mu-\mu')\cos\theta+\sin\theta\,(1+\mu\mu')]=\mu\, h/a.$$

**240. Proposed by S. A. COREY, Hiteman, Iowa.**

A perfectly flexible wire rope weighing one pound per foot is suspended from the tops of two vertical supports 300 feet apart, one support being 30 feet higher than the other. One end of the rope is fastened to the top of the higher support, while 600 feet of the rope hangs vertically from the top of the lower support. Assuming that the rope is free to slide over the top of the lower support without friction, find the lowest point of that portion of the rope which is suspended between the supports. Also find the amount of work which must be performed in raising the lowest point to make it coincide with the top of the lower support by exerting a pull on the free end of the rope.